

Sheet (6)

1. What is meant by Retentive timers?

- Retentive ON-Delay Timer (RTO) or retentive timer is used when you want to retain the accumulated time (AT) values even if the timer is de-energized (the rung state of the timer is changed from true to false).
- The accumulated time (AT) of RTO does not rest to 0 when the timer is de-energized.
- To reset the accumulated value of the timer to 0, use a reset (RES) instruction in another rung with the same address as the RTO.

2. Explain the timing parameters of PLCs timers.

(1) Time Base (TB):

- TB is the intervals that the timers time out at.
- Time bases are available in fractions and multiples of seconds.
(EX: TB = 0.1 TB=0.01 TB=1)

(2) Preset Time (PR):

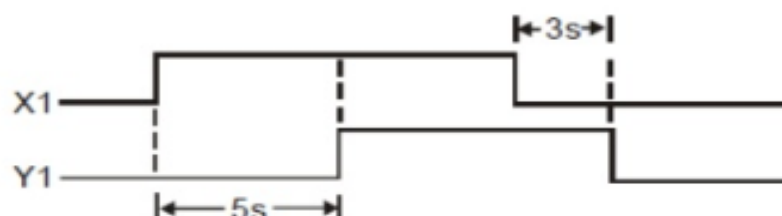
- The preset value is the delay time for the timer.
- To find the delay time multiply the time base by the preset value
(EX: TB = 0.1, PR = 50
The delay time = $50 \times 0.1 = 5 \text{ Sec}$)

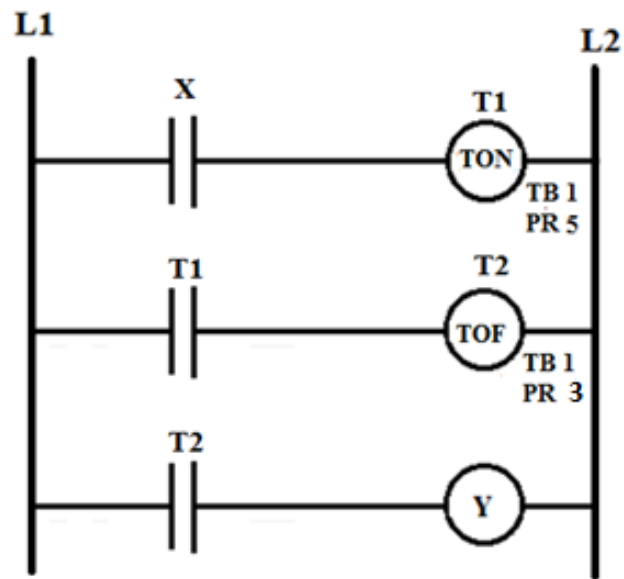
(3) Accumulated time:

- Represents the amount of time that has elapsed from the moment the timing started until the preset value reached.

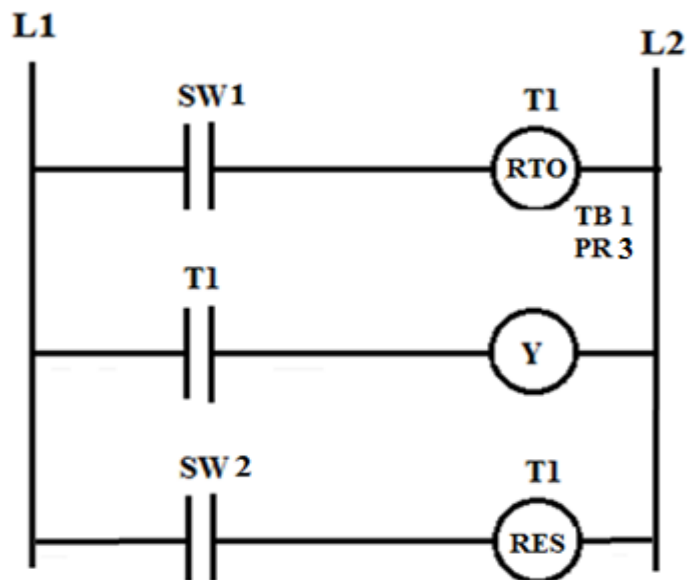
3. Draw a suitable Ladder diagrams to perform the following tasks:

- When the switch X1 is ON, the output Y1 will be ON after 5 Sec.
- When the switch X1 is OFF, the output Y1 will be OFF after 3 Sec.

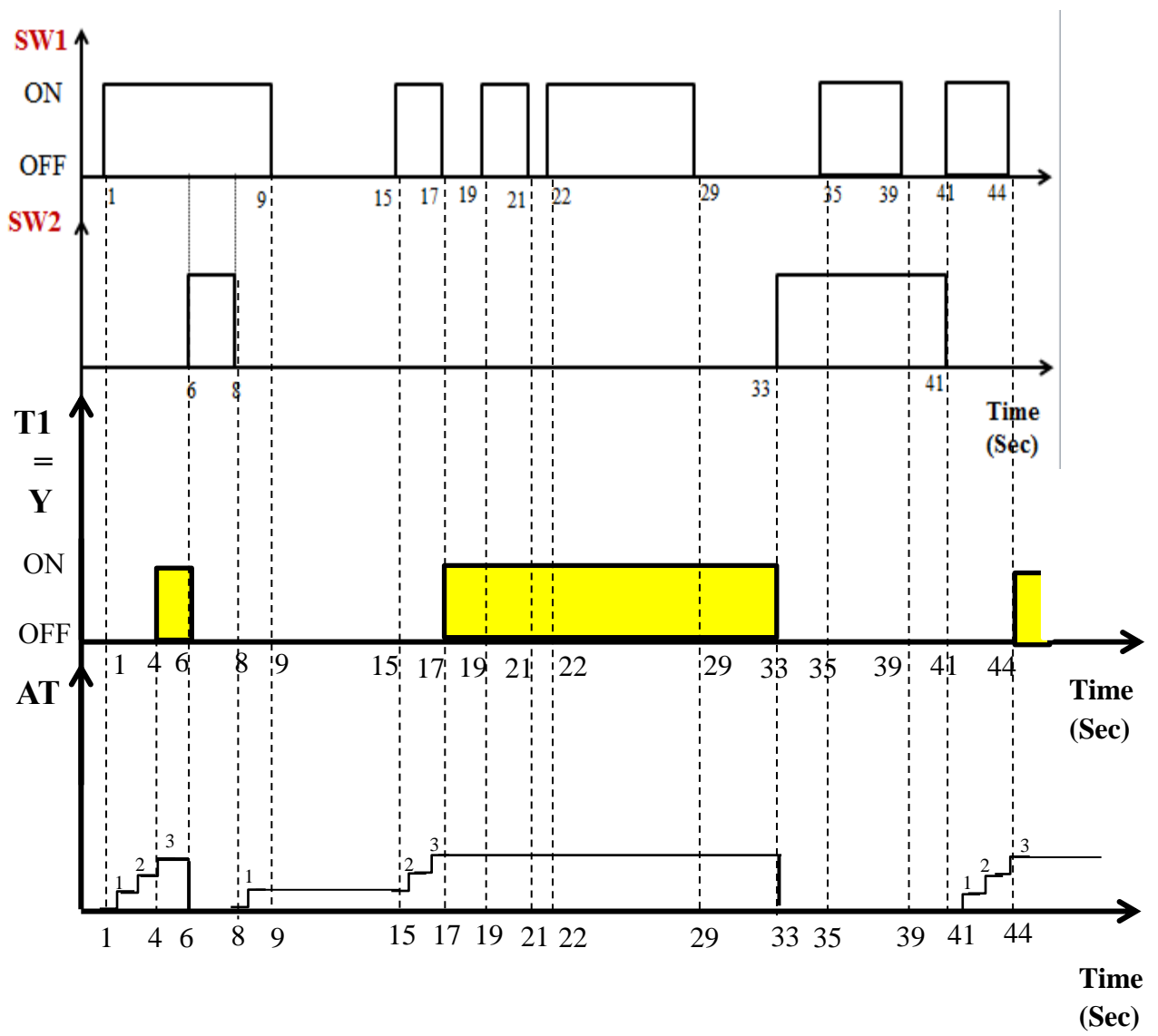




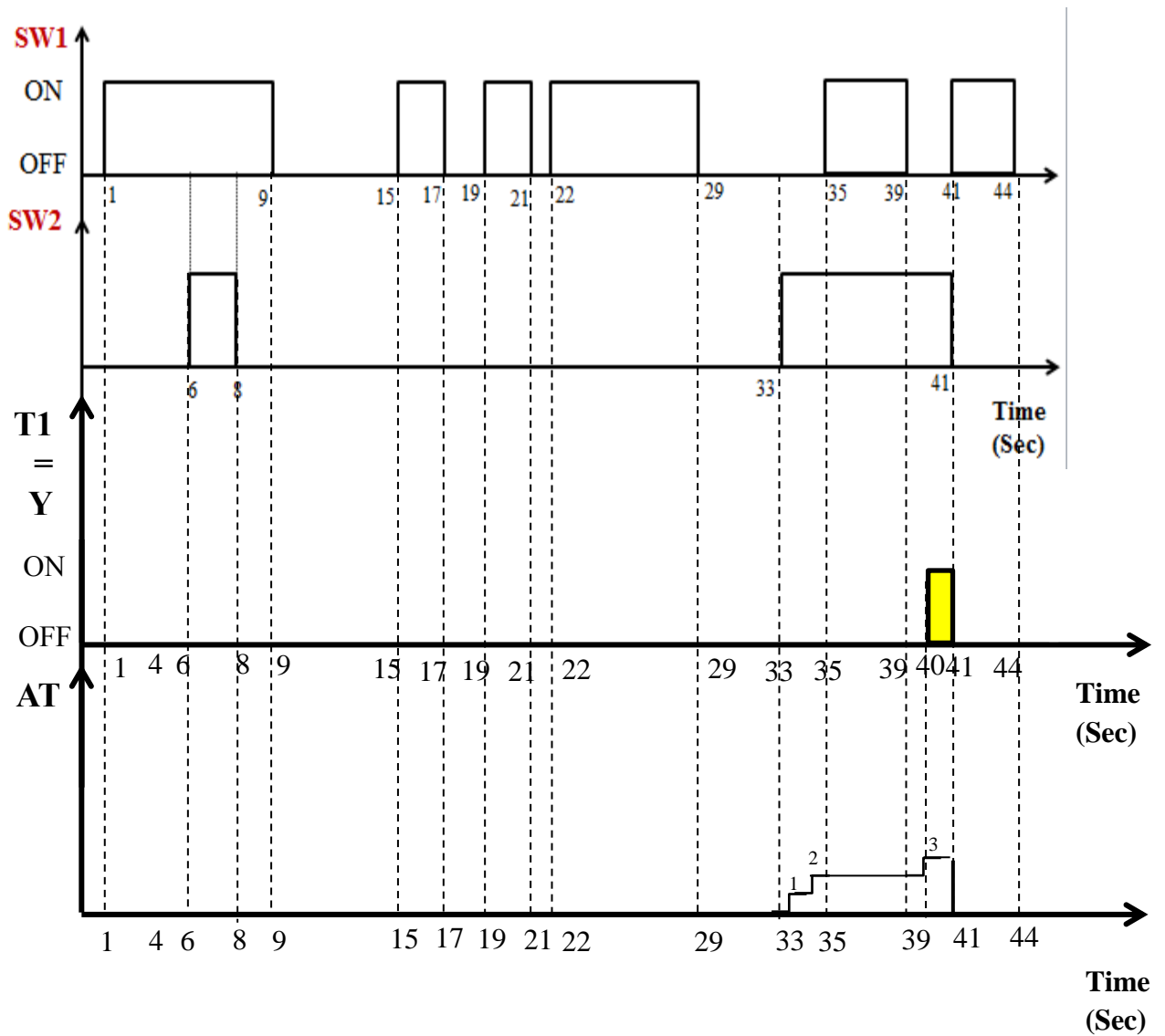
4. For the following ladder diagram:



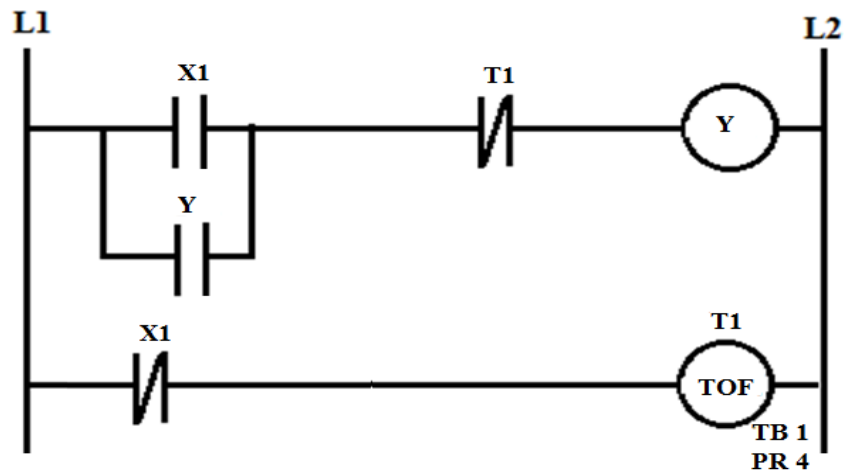
Using timing diagram, illustrate the states of T1, AT and Y. The states of SW1 and SW2 are shown in the following figure:



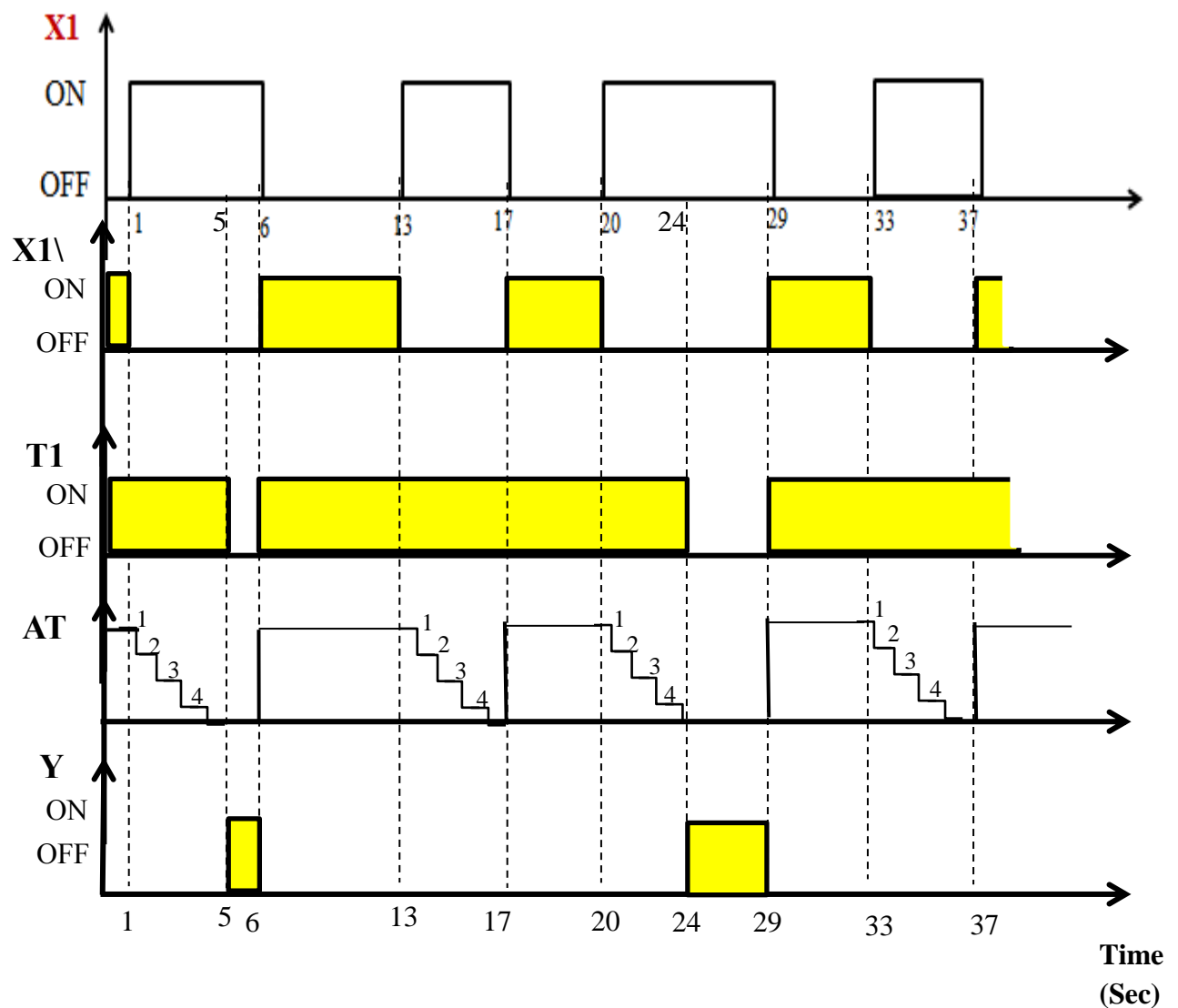
5. Repeat Q (4), if we replace SW1 and SW2 in ladder diagram with N.C contacts instead of N.O contacts.



6. For the following ladder diagram:



Using timing diagram, illustrate the states of T1, AT and Y. The state of X1 is shown in the following figure:



7. Draw a ladder diagram to control a traffic sign lights such that it changes automatically with the following sequence:

- Green light for 15 sec.
- Green and Yellow light for 4 sec.
- Red light for 12 sec.

